

REMARKS

In this Response, claims 27, 35, 40 and 44-45 have been amended, no claims have been newly cancelled, and no new claims have been added. Support for these amendments is found throughout the specification. No new matter has been added.

Claims 27-31 and 33-47 remain pending.

Claim Rejections - 103

In the Office Action claims 27-28, 31, 33-39, and 47 were rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa et al (Japanese Patent Application 2001-319308) (hereinafter "Ogawa") in view of Shattil (US Pub No. 2004/0086027) (hereinafter "Shattil") and Priotti (US Pub. 2004/0120410) (hereinafter "Priotti"). The rejection of these claims is respectfully traversed for the following reasons.

Claim 1 has been amended to better clarify its scope. Amended claim 1 recites in part:

computing ... a *channel matrix* that is representative of a channel response ...;
receiving ... a plurality of uplinked spatial division multiple access (SDMA) data streams ...;
converting the plurality of SDMA data streams from a first time domain to a frequency domain;
separating, with a spatial demapper, the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain based at least in part on the channel matrix...

Thus, in claim 1, the separation of the plurality of data streams in the frequency domain, by the spatial demapper, into the plurality of data streams in the frequency domain is based at least in part on the computed channel matrix.

The Office Action acknowledges that Ogawa fails to disclose features associated with separating the plurality of data streams,¹ but alleges that Shattil cures such deficiencies of Ogawa. The Office Action equates Shattil's element 225 in Fig. 2B with the recited spatial demapper used for separating the data streams. The Office Action also refers to Shattil's Figs. 4J and 10B to allege that Shattil discloses separating data

¹ Office Action, page 6, fourth paragraph.

streams. Furthermore, the Office Action refers to Shattil's paragraphs 191 and 192 to allege that Shattil discloses separating data streams based on channel response.

Shattil discloses that the demapper 225 of Fig. 2B "not only provides sub-carrier combining to reconstruct a desired data symbols, it may also perform combining to separate or remove interference symbols."² Thus, Shattil's demapper 225 arguably separates or removes interference symbols from desired data symbols. However, Shattil does not disclose that the demapper 225 separates a *plurality of data streams into a separated plurality of data streams*. The output of Shattil's demapper 225, as illustrated in Fig. 2B, is a single data stream (rather than a separated plurality of data streams, as recited in claim 1). Furthermore, Shattil's demapper 225 does not perform the separation or removal of interference symbols based on any channel matrix, as recited in claim 1.

Also, in Shattil's Fig. 4J (cited in the Office Action), an FFT 472 receives an input signal in time domain from a receiver RX 461, and generates N frequency-domain components.³ Thus, Shattil's generation of the N frequency-domain components, by the FFT 472, involves conversion of a time domain signal to N frequency domain signals. Shattil, however, does not disclose or suggest that the separation is performed on a plurality of data streams *in the frequency domain* to generate a separated plurality of data streams *in the frequency domain*. Rather, in Shattil, the separation is from a time domain signal to N frequency domain signals. In contrast, as recited in claim 1, the separation is performed on a *plurality of SDMA data streams in the frequency domain*.

Furthermore, the time-domain to frequency-domain conversion and generation of N frequency-domain components in Shattil is based on "projecting the received signal onto an orthonormal basis of the transmitted signals."⁴ Thus, even if, *for arguments sake*, the generation of the N frequency-domain components by Shattil's FFT 472 is assumed to be somehow equated to the recited separating (although there is no reason behind such equating), the generation of the N frequency-domain components by

² Shattil, paragraph [0100], lines 9-12, underlining added.

³ Shattil, paragraph [0141], lines 3-8.

⁴ Shattil, paragraph [0139], lines 4-8.

Shattil's FFT 472 is based on orthonormal basis of the transmitted signals. However, the generation of the N frequency-domain components by Shattil's FFT 472 is not based on a channel matrix, as recited in claim 1.

Shattil discloses the following while discussing Fig. 10B (another figure of Shattil cited in the Office Action):

"A set of M time-domain to frequency-domain converters, such as DFTs 1071 to 1079 are adapted to separate received signals in each branch into a plurality N of sub-carrier values."⁵

Thus, the separation disclosed with respect to Shattil's Fig. 10B is performed by time-domain to frequency-domain converters. In contrast, the recited separation of claim 1 is performed on a plurality of SDMA data streams in the frequency domain, resulting into a separated plurality of data streams in the frequency domain. Furthermore, there is no indication in Shattil that the separation in Fig. 10B is performed based on a channel matrix.

Furthermore, the Office Action cites paragraphs 0191-0192 of Shattil to allege that Shattil discloses separating data streams based on channel response. Cited paragraphs 0191-0192 of Shattil disclose the following:

Each of the invertible-transform circuits 1104.1 to 1104.M transforms an input time-domain signal into a plurality N of frequency-domain components. The components are weighted with at least one set of CI combining weights $\alpha_m(n)$... by a plurality M of component-weighting modules 1105.1 to 1105.M. In the case where MMSE combining is employed, the weights $\alpha_m(n)$ are expressed by:

$$\alpha_m(n) = h_m^*(n) / (|h_m(n)|^2 + \sigma^2)$$

where $h_m(n)$ is the channel response for the n^{th} frequency channel of the m^{th} spatial subchannel..." (Underlining added).

Thus, in the cited section, Shattil discloses transforming an input time domain signal into N frequency domain components, and subsequently weighing the components using weights that are associated with channel responses. Although Shattil discloses weighing the N frequency domain components using weights that are associated with channel responses, Shattil does not disclose or suggest that the actual transformation of the input time domain signal into N frequency domain components

⁵ Shattil, paragraph [0186], lines 7-10, underlining added.

(which, as best understood by the undersigned, is equated to the recited separating) is based on a channel response. Rather, after the input signal is already separated, Shattil weighs the N frequency domain components using weights that are associated with channel responses. Thus, Shattil does not disclose or suggest separating ... the plurality of SDMA data streams ... based at least in part on the channel matrix, as recited in claim 1.

Furthermore, in Shattil's paragraph 0191-0192, separation is performed on an input signal in time domain into N frequency domain signal. In contrast, in claim 1, separation is performed on the plurality of SDMA data streams in the frequency domain, resulting into a separated plurality of data streams in the frequency domain. As previously discussed, Shattil does not disclose such features.

Although Priotti, the third reference cited in the Office Action, allegedly discloses features associated with a synchronization module, Priotti does not cure the above discussed deficiencies of Ogawa and Shattil.

For at least these reasons, claim 1 is allowable, along with associated dependent claims 28, 31, 33-34 and 47.

Independent claim 35 includes features that are similar to those discussed with respect to claim 1. Accordingly, claim 35 is allowable for at least the reasons claim 1 is allowable, along with associated dependent claims 36-39.

Claims 29 and 30 were rejected under 35 USC 103(a) as being unpatentable over Ogawa in view of Shattil and Priotti, as applied to claim 27, and further in view of Perahia (U.S. 7,352,718) (hereinafter "Perahia"). Although Perahia allegedly discloses receiving data streams in response to a polling communication, Perahia does not cure the above discussed deficiencies of Shattil. Accordingly, claims 29 and 30 are allowable for at least the reasons associated independent claim 1 is allowable.

Claims 40 and 42-46 were rejected under 35 USC 103(a) as being unpatentable over Perahia in view of Shattil and Priotti. Independent claims 40 and 44 have been amended to recite features similar to the above discussed features of independent claim 1. Although Perahia allegedly discloses features associated with SDMA data streams, Perahia does not cure the above discussed deficiencies of Shattil. Accordingly,

independent claims 40 and 44 are allowable for at least the reasons associated independent claim 1 is allowable, along with associated dependent claims 42-43 and 45-46.

Claim 41 was rejected under 35 USC 103(a) as being unpatentable over Perahia in view of Shattil and Priotti, as applied to claims 27 and 40, and further in view of Shattil (US Pub 2002/0150070) (hereinafter "Shattil070"). Although Shattil070 allegedly discloses features associated with a demultiplexer, Shattil070 does not cure the above discussed deficiencies of Shattil. Accordingly, claim 41 is allowable for at least the reasons associated independent claim 40 is allowable.

Conclusion

In light of the above remarks, the Applicants respectfully submit that claims 27-31 and 33-47 are in condition for allowance. Early issuance of Notice of Allowance is respectfully requested. In the event that a Notice of Allowance cannot be promptly issued, the Applicants request that the Examiner contact the Applicants' undersigned representative at 503-796-2972 to discuss any unresolved issues.

The Commissioner is hereby authorized to charge shortages or credit overpayments to Deposit Account No. 500393.

Respectfully submitted,
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